

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 USC 371		ATTORNEY DOCKET NO 209684 U.S. APPLICATION NO Unassigned 09/787004
INTERNATIONAL APPLICATION NO PCT/NL99/00569	INTERNATIONAL FILING DATE 14 September 1999	PRIORITY DATE CLAIMED 15 September 1998
TITLE OF INVENTION DAIRY PRODUCT AND METHOD FOR PREPARING SAME		
APPLICANT(S) FOR DO/EO/US Vermin et al.		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 USC 371.		
2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 USC 371.		
3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 USC 371(f)).		
4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).		
5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 USC 371(c)(2)) <ul style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 		
6. <input type="checkbox"/> An English language translation of the International Application as filed (35 USC 371(c)(2)).		
7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 USC 371(c)(3)) <ul style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 		
8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 USC 371(c)(3)).		
9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 USC 371(c)(4)).		
10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 USC 371(c)(5)).		
11. Nucleotide and/or Amino Acid Sequence Submission <ul style="list-style-type: none"> a. <input type="checkbox"/> Computer Readable Form (CRF) b. Specification Sequence Listing on: <ul style="list-style-type: none"> i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper Copy c. <input type="checkbox"/> Statement verifying identity of above copies 		
Items 12 to 19 below concern other document(s) or information included:		
12. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Form PTO-1449 <input checked="" type="checkbox"/> Copies of Listed Documents 		
13. <input type="checkbox"/> An assignment for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.		
14. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.		
15. <input type="checkbox"/> A substitute specification.		
16. <input type="checkbox"/> A change of power of attorney and/or address letter.		
17. <input checked="" type="checkbox"/> Application Data Sheet Under 37 CFR 1.76		
18. <input checked="" type="checkbox"/> Return Receipt Postcard		
19. <input checked="" type="checkbox"/> Other items or information: Claims as Amended on March 12, 2001		

09/787004

U.S. APPLICATION NO Unassigned 09/787004	INTERNATIONAL APPLICATION NO PCT/NL99/00569	ATTORNEY DOCKET NO 209684
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<input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... \$1,000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO..... \$ 860.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO, but international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... \$ 710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)..... \$ 690.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1) to (4)..... \$ 100.00					
ENTER APPROPRIATE BASIC FEE AMOUNT=				\$860.00	
Surcharge of \$130.00 for furnishing the National fee or oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date				\$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	20	-20=	0	x \$ 18.00	\$0.00
Independent Claims	3	- 3 =	0	x \$ 80.00	\$0.00
<input type="checkbox"/> Multiple Dependent Claim(s) (if applicable)				+\$270.00	\$0.00
TOTAL OF ABOVE CALCULATIONS=				\$860.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0.00	
SUBTOTAL=				\$860.00	
Processing fee of \$130.00 for furnishing English Translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date.				\$0.00	
TOTAL NATIONAL FEE=				\$860.00	
Fee for recording the enclosed assignment. The assignment must be accompanied by an appropriate cover sheet. \$40.00 per property				+	\$0.00
TOTAL FEE ENCLOSED=				\$860.00	
				Amount to be refunded	\$
				charged	\$

- a. A check in the amount of \$860.00 to cover the above fee is enclosed.
- b. Please charge Deposit Account No. 12-1216 in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 12-1216. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Customer Number: 23460



23460

PATENT TRADEMARK OFFICE

Mark Joy, Registration No. 35,562
 One of the Attorneys for Applicant(s)

Date: March 12, 2001

U.S. APPLICATION NO Unassigned	INTERNATIONAL APPLICATION NO PCT/NL99/00569	ATTORNEY DOCKET NO 209684
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CERTIFICATION UNDER 37 CFR 1.10

"Express Mail" Label Number: EL643542654US

Date of Deposit: March 12, 2001

I hereby certify that this express request to begin national examination procedures under 35 USC 371(f) of the International Patent Application referenced above, including all of the items listed thereon as enclosures, is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" Service under 37 CFR 1.10 on the date indicated above and is addressed to Box PCT, Assistant Commissioner for Patents, Attention: DO/EO/US, Washington, D.C. 20231.

Carlton Owens
Printed Name of Person Signing:

Carlton Owens
Signature

09/787004

JG08 Rec'd PCT/PTO 12 MAR 2001

PATENT
Attorney Docket No. 209684

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Vermin et al.

Application No.: Not Assigned

Art Unit: Not Assigned

Filed: March 12, 2001

Examiner: Not Assigned

For: DAIRY PRODUCT AND METHOD FOR
PREPARING SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

AMENDMENTS

IN THE SPECIFICATION:

Page 1, below the title, please insert the following paragraph:

CROSS REFERENCE TO RELATED APPLICATION

The present application claims priority of Vermin et al., PCT Application PCT/NL99/00569 filed on September 14, 1999, and Vermin et al., Netherlands Application Serial No. 1010096 filed on September 15, 1998 entitled "Dairy Product and Method for Preparing Same."

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Page 1, line 1, please insert the following heading:

AREA OF THE INVENTION

Page 1, line 4, please insert the following heading:

BACKGROUND OF THE INVENTION

Page 2, line 20, please insert the following heading:

SUMMARY OF THE INVENTION

Page 2, line 34, please insert the following heading:

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

IN THE CLAIMS:

Please amend claims 1-9 to read as follows:

1. (Amended) A method for preparing a dairy product comprising the steps of:
treating a medium comprising milk or a milk product under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism to render a treated medium comprising milk or a milk product, and
maintaining the treated medium comprising milk or a milk product under anaerobic conditions.
2. (Amended) The method according to claim 1, in which the microorganism is a yeast.

3. (Amended) The method according to claim 2, in which the yeast originates from one of the following set of strains: *Candida zelanoidea*, *Debaryomyces hansenii spp hansenii*, *Saccharomyces cerevisiae*, *Candida robusta*, or *Zygosaccharomyces rouxii*.

4. (Amended) The method according to claim 10, in which the bacterium originates from one of the following set of strains: *Micrococcus luteus*, *Arthrobacter*, *Corynebacterium* or *Arthrobacter ssp*.

5. (Amended) The method according to claim 1, in which the medium is treated under anaerobic conditions with a food-technologically acceptable lactic acid bacterium.

6. (Amended) The method according to claim 1 in which the dairy product is thermized.

7. (Amended) A dairy product prepared by treating a medium comprising milk or a milk product under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism to render a treated medium comprising milk or a milk product; and maintaining the treated medium comprising milk or a milk product under anaerobic conditions.

8. (Amended) A method for producing a food comprising a dairy product comprising: introducing a lactose-negative, food-technologically acceptable microorganism to a medium comprising milk or a milk product, thereby imparting an aroma to the dairy product.

9. (Amended) The method according to claim 7 further comprising preparing an aromatized food product including the dairy product.

Please add the following new claims 10-20:

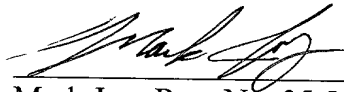
10. (New) The method according to claim 1, in which the microorganism is a bacterium.
11. (New) The method of claim 2 wherein the dairy product is thermized.
12. (New) The method of claim 3 wherein the dairy product is thermized.
13. (New) The method of claim 3 wherein the dairy product is thermized.
14. (New) The method of claim 3 wherein the dairy product is thermized.
15. (New) The dairy product according to claim 7, in which the microorganism is a yeast.
16. (New) The dairy product according to claim 15, in which the yeast originates from one of the following set of strains: *Candida zelanoides*, *Debaryomyces hansenii spp hansenii*, *Saccharomyces cerevisiae*, *Candida robusta*, or *Zygosaccharomyces rouxii*.
17. (New) The dairy product according to claim 7, in which the microorganism is a bacterium.
18. (New) The method according to claim 17, in which the bacterium originates from one of the following set of strains: *Micrococcus luteus*, *Arthrobacter*, *Corynebacterium* or *Arthrobacter ssp*.
19. (New) The method according to claim 7, in which the medium is treated under anaerobic conditions with a food-technologically acceptable lactic acid bacterium.

20. (New) The method according to claim 7 in which the dairy product is thermized.

REMARKS

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



Mark Joy, Reg. No. 35,562
One of the Attorneys for Applicant(s)
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: March 12, 2001

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PATENT
Attorney Docket No. 209684

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Vermin et al.

Application No.: Not Assigned

Art Unit: Not Assigned

Filed: March 12, 2001

Examiner: Not Assigned

For: DAIRY PRODUCT AND METHOD FOR
PREPARING SAMECLAIMS AS AMENDED ON MARCH 12, 2001

1. (Amended) A method for preparing a dairy product [, in which] comprising the steps of:
- treating a medium comprising milk or a milk product [is treated] under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism to render a treated medium comprising milk or a milk product, and
- maintaining the treated medium comprising milk or a milk product [is then kept] under anaerobic conditions [for some time].
2. (Amended) [A] The method according to claim 1, in which the microorganism is a yeast [or a bacterium is].
3. (Amended) [A] The method according to claim 2, in which the yeast originates from one of the following set of strains: [strain] *Candida zelanoides*, *Debaryomyces hansenii* spp *hansenii*, *Saccharomyces cerevisiae*, *Candida robusta*, or *Zygosaccharomyces rouxii*.

4. (Amended) [A] The method according to claim [2] 10, in which the bacterium originates from one of the following set of strains: [strain] *Micrococcus luteus*, *Arthrobacter*, *Corynebacterium* or *Arthrobacter ssp.*

5. (Amended) [A] The method according to claim 1, in which the medium is treated under anaerobic conditions with a food-technologically acceptable lactic acid bacterium.

6. (Amended) [A] The method according to claim 1 [any of the preceding claims] in which the dairy product is thermized.

7. (Amended) A dairy product [obtainable] prepared by [a method according to any of the preceding claims] treating a medium comprising milk or a milk product under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism to render a treated medium comprising milk or a milk product; and
maintaining the treated medium comprising milk or a milk product under anaerobic conditions.

8. (Amended) A method for producing a food comprising a dairy product comprising: [The use of] introducing a lactose-negative, food-technologically acceptable microorganism [for] to a medium comprising milk or a milk product, thereby imparting an aroma to [a] the dairy product.

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9. (Amended) The [use of a dairy product] method according to claim 7 further comprising preparing [for the preparation of] an aromatized food product [in the food industry] including the dairy product.

10. (New) The method according to claim 1, in which the microorganism is a bacterium.

11. (New) The method of claim 2 wherein the dairy product is thermized.

12. (New) The method of claim 3 wherein the dairy product is thermized.

13. (New) The method of claim 3 wherein the dairy product is thermized.

14. (New) The method of claim 3 wherein the dairy product is thermized.

15. (New) The dairy product according to claim 7, in which the microorganism is a yeast.

16. (New) The dairy product according to claim 15, in which the yeast originates from one of the following set of strains: *Candida zelanooides*, *Debaryomyces hansenii spp hansenii*, *Saccharomyces cerevisiae*, *Candida robusta*, or *Zygosaccharomyces rouxii*.

17. (New) The dairy product according to claim 7, in which the microorganism is a bacterium.

18. (New) The method according to claim 17, in which the bacterium originates from one of the following set of strains: *Micrococcus luteus*, *Arthrobacter*, *Corynebacterium* or *Arthrobacter ssp.*

19. (New) The method according to claim 7, in which the medium is treated under anaerobic conditions with a food-technologically acceptable lactic acid bacterium.

20. (New) The method according to claim 7 in which the dairy product is thermized.

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Title: Dairy product and method for preparing same.

The invention relates to a method for preparing a dairy product and to a dairy product obtainable by this process.

In the course of years more and more different types
5 of dairy products have been developed. The consumer can choose among a wide range of products, such as custard in all kinds of flavors, ice cream, yogurt and yogurt beverages, quark (curd cheese), Biogarde[®], sour cream, whipped cream and crème fraîche.

10 A number of the available dairy products are so-called fermented dairy products. That is to say that in the preparation of these products a fermentation step is carried out. In such a fermentation step the product is treated with microorganisms and/or enzyme systems which
15 converts the lactose present in the product to a greater or lesser extent. Such fermentations yield, depending on the employed microorganism or mixtures of microorganisms and enzymes, a dairy product having a characteristic flavor and texture. Examples of fermented dairy products are yogurt,
20 Biogarde[®], Biomild[®], quark and sour cream.

In order to give dairy products, both fermented and non-fermented, a specific desired flavor, diverse additives are added. Many employed additives are sweeteners, flavorings, aromatics and colorings. In products such as
25 custard, fruit yogurt and yogurt beverages, it is conventional to use artificial additives, fruit juices or plant extracts.

Of a number of dairy products the consumer wishes a natural variant. By this is meant a dairy product which
30 owes its characteristic appearance and flavor to the nature of the dairy product itself, without additives being added. Dairy products of which in particular the availability of natural variants is expected are yogurt, quark, buttermilk and the like.

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U.S. patent 4,675,193 discloses a two-step method for preparing a product having a cheese flavor. To this end, in the first step a flavor developing medium having a fat content between 0.5 and 50% (w/v) and a protein content between 0.3 and 12% (w/v), for instance milk or whey, is treated with a lipase and/or protease source. This step is carried out under aerobic conditions, after which the employed lipase and/or protease source is deactivated. In a second step a fermentation with a lactic acid producing microorganism is carried out.

As the lipase and/or protease source, non-pathogenic microorganisms are preferably used, such as *Penicillium roqueforti*, *Oidium lactis* (*Geotrichum candidum*), *Cladisporum butaryl*, *Micrococcus* and *Candida lipsolytica*. Preferably, *C. lipsolytica* is used.

The treatment step in which the flavor developing medium is used comprises a fermentation in which the lipase and/or protease source acidifies the medium to a pH between 4.5 and 5.5, followed by a deactivation.

It is an object of the invention to provide a dairy product which as regards texture corresponds to a known dairy product, such as yogurt or quark, but which has a different flavor and/or odor.

Surprisingly, it has been found that such dairy products can be prepared by bringing a specific aroma into the dairy product, which aroma is produced by a specific aerobic microorganism which is kept under anaerobic conditions for some time. Preferably, a conventional fermentation is carried out during this anaerobic period.

The invention relates to a method for preparing a dairy product in which a medium comprising milk or a milk product is treated under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism.

It has been found that in a medium treated under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism during an

anaerobic period there are formed characteristic aromas. The nature of the aroma can be adjusted by the choice of the microorganism within the class of lactose-negative, food-technologically acceptable microorganisms.

5 The aroma imparted according to the invention to a dairy product originates from a microorganism which hardly changes the starting material for the dairy product to be prepared in the sense that lactose is not converted. There is thus obtained a dairy product which as regards the
10 texture is substantially equal to known variants of the dairy product prepared, but which has a completely new flavor and/or odor.

On the other hand, the use of a lactose-negative microorganism in the preparation of a dairy product is
15 known per se. In J. Dairy Sci., (1996) 79:937-942, Kwak et al. describe a method in which a lactose-negative yeast of the species *Saccharomyces cerevisiae* is used to stabilize kefir. Kefir is a traditional, Russian, fermented milk beverage containing a minor amount of alcohol and carbon
20 dioxide. According to Kwak et al. the lactose-negative microorganism is used to produce alcohol in a preliminary phase under anaerobic conditions. After this preliminary phase an acidification with lactic acid bacteria is carried out.

25 The starting material for the method according to the invention is a medium comprising milk or a milk product. It is possible to use both a non-treated milk and a milk which has been subjected previously to a heat treatment, such as a pasteurization or sterilization.

30 In order to prevent outgrowth of any present, contaminating microorganisms, it is preferred to start from a milk which has been previously subjected to a heat treatment.

It is also possible to use a milk-derived product
35 having an adapted fat content, such as skim milk or cream.

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In addition to the milk or the milk product, the medium can and will generally comprise nutrients for the lactose-negative, food-technologically acceptable microorganism. It is conventional to subdivide these nutrients into carbon sources and nitrogen sources. Suitable carbon sources are substances which can supply the carbon required for the ripening of the lactose-negative, food-technologically acceptable microorganism, and which are compatible with the dairy product (to be prepared). Examples are glucose and potato dextrose broth (PDB). Suitable nitrogen sources are substances which can supply the nitrogen required for the ripening of the lactose-negative, food-technologically acceptable microorganism and have no negative effect on the dairy product (to be prepared). Examples are malt extract, yeast extract and tryptone.

The choice of the nutrients to be used will depend on the nature of the lactose-negative, food-technologically acceptable microorganism. When the lactose-negative, food-technologically acceptable microorganism is a yeast, glucose, PDB and tryptone are preferably used as nutrients. When the lactose-negative, food-technologically acceptable microorganism is a bacterium, glucose and/or tryptone are preferably used as nutrients.

The amounts of the nutrients in the medium which form the starting material for a method according to the invention are adjusted to the nature of the lactose-negative, food-technologically acceptable microorganism. The total amount of added nutrients required for the aroma-forming microorganism should be sufficient to grow the microorganism, but not so large as to bring about an undesired aroma or an aroma of an undesired intensity. When the carbon source is PDB, in the case that the lactose-negative, food-technologically acceptable microorganism is a yeast, the amount thereof will range between 1 and 3 g. When in the same case tryptone is the nitrogen source, 0.2

to 1 g thereof will be used. When the carbon source is glucose, in the case that the lactose-negative, food-technologically acceptable microorganism is a bacterium, the amount thereof will range between 0.5 and 5 g. When in
5 the same case tryptone is the nitrogen source, 0.2 to 1 g thereof will be used. All this can be simply established by those skilled in the art by way of experiment.

The microorganism with which the medium according to the invention is treated is a lactose-negative, food-
10 technologically acceptable microorganism. By this is meant a microorganism which is not capable of converting lactose. In other words, when only lactose is present as the carbon source, the microorganism cannot grow.

Preferably, the lactose-negative, food-
15 technologically acceptable microorganism is a yeast or a bacterium. Very suitable yeast strains are *Candida zelanoides* CBS 2328, *Candida zelanoides* ATCC 26318, *Debaryomyces hansenii* CBS 772, *Debaryomyces hansenii* ATCC 10623, *Saccharomyces cerevisiae* CBS 400, *Saccharomyces*
20 *cerevisiae* CBS 437, *Candida robusta* CBS 420 and *Zygosaccharomyces rouxii* CBS 441. Very suitable bacteria originate from the strains *Micrococcus luteus* ATCC 4698, *Micrococcus luteus* CIP A270, *Arthrobacter nicotiana* ATCC 21279 and *Corynebacterium flavescens* ATCC 10340.

25 It is also possible to use combinations of lactose-negative, food-technologically acceptable microorganisms.

The choice of the lactose-negative, food-technologically acceptable microorganism or the combination of lactose-negative, food-technologically acceptable
30 microorganisms can be suitably adjusted to the desired aroma. It has been found that by means of the treatment with the above microorganisms there can be produced a wide range of aromas, including caramel, chocolate, cheesy, nutty, garlic, and a neutral aroma which, however, makes
35 the flavor of the fermentation product richer and rounder.

In order to obtain the desired aroma, the medium comprising the milk or the milk product is treated with the lactose-negative, food-technologically acceptable microorganism. This lactose-negative, food-technologically acceptable microorganism is added to the medium and ripened. The amount of the lactose-negative, food-technologically acceptable microorganism can be suitably adjusted to the amount of medium and the amount (the strength) of the desired aroma. The lactose-negative, food-technologically acceptable microorganism will generally be used in an amount of 10^6 to 10^7 per ml of milk or milk product.

The ripening of the lactose-negative, food-technologically acceptable microorganism is effected under aerobic conditions. The pH and the temperature during the ripening will depend on the employed specific lactose-negative, food-technologically acceptable microorganism. In most cases the pH will range between 6 and 7. The temperature will mostly be chosen between 25 and 30°C.

Preferably, the ripening is effected so as to be complete. The duration of the ripening depends on the stationary growth phase of the employed microorganism, and will generally range between 12 and 24 hours. This has the result that the nutrients present in the medium are consumed and remainders of any nutrients added will hardly, if at all, find their way into the ready dairy product. The moment at which the ripening is complete, can be suitably determined by following the content of one or more of the nutrients, for instance of glucose. It is also possible to follow the growth of the lactose-negative, food-technologically acceptable microorganism by means of conventional plate counts.

After the ripening the resulting product is brought under anaerobic conditions for some time. It has been found that in the absence of oxygen the aromas of the ripening strain are formed and are excellently expressed.

During the aroma formation a neutral pH is preferably used. In most cases a period of 5 to 12 hours will be sufficient to obtain a proper aroma formation.

The thus obtained product is suitable per se for
5 consumption. It will be clear that the formation of the
desired aromas can take place for instance after the dairy
product has been packaged into a container in which
conventional anaerobic conditions prevail. Often, however,
the resulting product will be thermized to increase the
10 keeping quality. Furthermore, depending on the desired
nature of the dairy product prepared, additional operations
can be carried out.

In a preferred embodiment the anaerobic conditions
coincide with a fermentation step. After addition of
15 conventional fermentation strains an anaerobic fermentation
is carried out in which lactose is converted into, inter
alia, lactic acid.

More in detail, the product obtained after the
ripening of the lactose-negative, food-technologically
20 acceptable microorganism is treated with a lactic acid
bacterium. Because of this treatment, the dairy product,
particularly as regards texture and acidity, will show
great similarities to known fermented dairy products, such
as yogurt or quark. On account of the change in the acidity
25 in a treatment with a lactic acid bacterium, this treatment
is often designated as acidification.

The nature of the lactic acid bacterium will be
suitably adjustable to the desired product by those skilled
in the art. The treatment with the lactic acid bacterium
30 can be carried out in the known manner and will be
analogous to the treatment of a milk or milk product with a
lactic acid bacterium in the preparation of fermented dairy
products which have not been treated with a lactose-
negative, food-technologically acceptable microorganism.

35 It will be clear that the invention also relates to
a dairy product that can be prepared by a method as

described above. Furthermore, the invention relates to the use of a dairy product that can be prepared according to the invention in the preparation of automated products in the food industry.

5 The invention will now be further explained on the basis of the following examples.

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Example 1**Yeast strains**

Candida zelanoides CBS 2328 from ampoule

Candida zelanoides ATCC 26318 from ampoule

5 *Debaryomyces hansenii* ATCC 10623 from ampoule

Debaryomyces hansenii ATCC 772 from ampoule

Bacterial strain:

Arthrobacter nicotiana ATCC 21279 from plate

Glucose solution:

10 8 g of glucose per 100 g of water (filter sterilized)

Yeast medium:

24 g of potato dextrose broth (PDB of Difco 0549-17-9)

+ 5 g of tryptone per liter of water.

Bacterial medium:

15 5 g of tryptone per 900 ml of water. Sterilized at
120 °C for 15 min and enriched with 100 ml of glucose
solution

Substrate:

whole UHT-milk

20

Culture

A colony of lactose-negative microorganisms is added
to water with glycerol and the solution is distributed over
several ampoules and frozen. Subsequently, 1 ml of thawed
25 medium is added to 25 ml of yeast or bacterial medium in an
Erlenmeyer of 100 ml. The Erlenmeyer is closed with
cellulose wadding and aerobically stored for 72 hours at
25°C (yeasts) and 30°C (bacteria) at a shaking speed of 200
rpm.

30

Pre-culture

5 ml of culture medium is added to 45 ml of whole UHT
milk (substrate) in an Erlenmeyer of 250 ml which is
closable with wadding. This solution is aerobically stored
for 24 hours or 12 hours with shaking at 200 rpm and at the
35 right temperature. After the pre-culture has been finished,
the media are cooled to ca. 7°C.

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Result

After an aerobic growth of the lactose-negative, food-technologically acceptable yeast *Candida zeylanoides* and an anaerobic aroma formation in milk, there is formed a product with a distinguishing flavor, to be associated with Munster cheese (stable flavor). When the starting material is lactose-negative bacterium *Arthrobacter*, a chocolate flavor is formed after an anaerobic aroma formation in milk. In this product branched chain aldehydes were the most important compounds that could be detected with "dynamic headspace GCMS".

Example 2**Yeast strains:**

15 *Candida zelanoides* CBS 2328 from ampoule
Cañdida zelanoides ATCC 26318 from ampoule

Bacterial strain:

Arthrobacter nicotiana ATCC 21279 from plate

Lactic acid bacteria:

20 For the preparation of yogurt

Glucose solution:

8 g of glucose per 100 g of water (filter sterilized)

Yeast medium:

25 24 g of potato dextrose broth (PDB of Difco 0549-17-9)
+ 5 g of tryptone per l of water.

Bacterial medium:

5 g of tryptone per 900 ml of water. Sterilized at 120°C for 15 min and enriched with 100 ml of glucose solution

30 **Substrate:**

whole UHT-milk

Culture

A colony of lactose-negative microorganism is added to water with glycerol and the solution is further distributed over several ampoules and frozen. Subsequently, 1 ml of thawed medium is added to 25 ml of yeast or bacterial medium in an Erlenmeyer of 100 ml. The Erlenmeyer is closed with cellulose wadding and aerobically stored for 72 hours at 25°C (yeasts) and 30°C (bacteria) at a shaking speed of 200 rpm.

Pre-culture

5 ml of culture medium is added to 45 ml of whole UHT milk (substrate) in an Erlenmeyer of 250 ml which is closable with wadding. This solution is aerobically stored for 24 hours or 12 hours with shaking at 200 rpm and at the right temperature. After the pre-culture has been finished, the media are cooled to ca. 7°C.

Acidification

The pre-culture is acidified under anaerobic conditions with a yogurt culture at 37°C to final pH 4.5 and further packaged in cooled condition (to ca. 5-7°C).

Result

When both products obtained in Example I are acidified with lactic acid bacteria, there are formed products having a consistency comparable to that of yogurt and having a distinguishing flavor clearly different from the flavor of a non-pretreated, acidified milk product.

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CLAIMS

1. A method for preparing a dairy product, in which a medium comprising milk or a milk product is treated under aerobic conditions with a lactose-negative, food-technologically acceptable microorganism, and is then kept
5 under anaerobic conditions for some time.
2. A method according to claim 1, in which the microorganism a yeast or a bacterium is.
3. A method according to claim 2, in which the yeast originates from the strain *Candida zelanoides*, *Debaryomyces*
10 *hansenii* spp *hansenii*, *Saccharomyces cerevisiae*, *Candida robusta*, or *Zygosaccharomyces rouxii*.
4. A method according to claim 2, in which the bacterium originates from the strain *Micrococcus luteus*, *Arthrobacter*, *Corynebacterium* or *Arthrobacter* ssp.
- 15 5. A method according to claim 1, in which the medium is treated under anaerobic conditions with a food-technologically acceptable lactic acid bacterium.
6. A method according to any of the preceding claims, in which the dairy product is thermized.
- 20 7. A dairy product obtainable by a method according to any of the preceding claims.
8. The use of a lactose-negative, food-technologically acceptable microorganism for imparting an aroma to a dairy product.
- 25 9. The use of a dairy product according to claim 7 for the preparation of an aromatized product in the food industry.

PCT/10

23 MAY 2001

**Declaration and Power of Attorney Patent Application
(Design or Utility)**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: 'Dairy product and method for preparing same'

the specification of which

- is attached hereto
- X was filed on March 12, 2001 as application serial no. 09/787,004 and or PCT International Application number PCT/NL99/00569 and was amended on (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information know to me to be material to patentability as defined in 37 C.F.R.§1.56.

I hereby claim foreign priority benefits under 35 U.S.C.§119(a)-(d) or 35 U.S.C.§365(b) of any foreign application(s) for patent or inventor's certificate, or 35 U.S.C.§365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate of PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)		
Number 1010096	Country NL	Day/Month/Year Filed 15-09-1998
Number	Country	Day/Month/Year Filed
Number	Country	Day/Month/Year Filed

PCT/10 40949460

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

Prior Provisional Application(s)	
Serial Number	Day/Month/Year Filing Date
Serial Number	Day/Month/Year Filing Date
Serial Number	Day/Month/Year Filing Date

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s), or under 35 U.S.C. §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

Prior U.S. or International Application(s)		
Serial Number	Day/Month/Year Filed	Status (patented, pending, abandoned)
Serial Number	Day/Month/Year Filed	Status (patented, pending, abandoned)
Serial Number	Day/Month/Year Filed	Status (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Power of Attorney

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Attorney

Registration Number

Berton Scott Sheppard	<u>20,922</u>
James B. Muskal	<u>22,797</u>
Dennis R. Schlemmer	<u>24,703</u>
Gordon R. Coons	<u>20,821</u>
John E. Rosenquist	<u>26,356</u>
John W. Kozak	<u>25,117</u>
Charles S. Oslakovic	<u>27,583</u>
Mark E. Phelps	<u>28,461</u>
H. Michael Hartmann	<u>28,423</u>
Bruce M. Gagala	<u>28,844</u>
Charles H. Mottier	<u>30,874</u>
John Kilyk, Jr.	<u>30,763</u>
Robert F. Green	<u>27,555</u>
John B. Conklin	<u>30,369</u>
James D. Zalewa	<u>27,848</u>
John M. Belz	<u>30,359</u>
Brett A. Hesterberg	<u>31,837</u>
Jeffrey A. Wyand	<u>29,458</u>
Paul J. Korniczky	<u>32,849</u>
Pamela J. Ruschau	<u>34,242</u>
Steven P. Petersen	<u>32,927</u>
John M. Augustyn	<u>33,589</u>
Christopher T. Griffith	<u>33,392</u>
Wesley O. Meuller	<u>33,976</u>
Jeremy M. Jay	<u>33,587</u>
Jeffrey B. Burgan	<u>35,463</u>
Eley O. Thompson	<u>36,035</u>
Mark Joy	<u>35,562</u>
Allen E. Hoover	<u>37,354</u>
David M. Airan	<u>38,811</u>
Michael H. Tobias	<u>32,948</u>
Xavier Pillai	<u>39,799</u>
Y. Kurt Chang	<u>41,397</u>
Gregory C. Bays	<u>40,505</u>
Carol Larcher	<u>35,243</u>
Thomas A. Miller	<u>40,091</u>
Steven H. Sklar	<u>42,154</u>
M. Daniel Hefner	<u>41,826</u>
Thomas A. Belush	<u>37,090</u>
Kenneth P. Spina	<u>43,297</u>
Gary R. Jarosik	<u>35,906</u>
Song Zhu	<u>44,420</u>
Joseph S. Ostroff	<u>39,321</u>
Jeffrey J. Makeever	<u>37,390</u>
Salim A. Hasan	<u>38,175</u>

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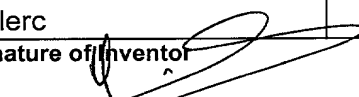
Richard A. Wulff	<u>42,238</u>
Jamison E. Lynch	<u>41,168</u>
Rattan Nath	<u>43,827</u>
Robert M. Gould	<u>43,642</u>
David J. Schodin	<u>41,294</u>
Paul L. Ahern	<u>17,020</u>
Theodore W. Anderson	<u>17,035</u>
Noel I. Smith	<u>18,698</u>

I hereby authorize them or others whom they may appoint to act and rely on instructions from and communicate directly with the person/organization who/which first sends this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instructed otherwise.

Please direct all correspondence in this case to at the address indicated below:

LEYDIG, VOIT, & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780

Full Name of Sole or First Inventor		
Family Name <u>Vermin</u>	First Given Name <u>Reinier</u>	Second Given Name <u>Johannes, C.</u>
Residence and Citizenship		
City of Residence <u>Woerden</u>	State or Country of Residence <u>The Netherlands NLX</u>	Country of Citizenship <u>The Netherlands</u>
Post Office Address		
Street Address <u>Bomschuit 19</u>	City <u>Woerden</u>	State & Zip Code or Country <u>3448 WE</u>
Signature of Inventor 		Date <u>05-03-2001</u>

Full Name of Second Inventor, if any		
Family Name <u>Spinner</u>	First Given Name <u>Henry-Eric</u>	Second Given Name
Residence and Citizenship		
City of Residence <u>Sevres</u>	State or Country of Residence <u>France FRX</u>	Country of Citizenship <u>France</u>
Post Office Address		
Street Address <u>32 Avenue de la Division Leclerc</u>	City <u>Sevres</u>	State & Zip Code or Country <u>92310</u>
Signature of Inventor 		Date <u>23.03.2001</u>

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